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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/811,078	KAKUTANI, TOSHIAKI	
	<b>Examiner</b>	<b>Art Unit</b>	
	Quang N. Vo	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-8, 16, 17, 20, 23, 26 and 27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 16, 17, 20, 23, 26 and 27 is/are rejected.
- 7) ☒ Claim(s) 5-8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

Regarding claim 1, Applicant's argument is *Otsuki* does not disclose a pixel group including multiple pixels.

In response: Shimizu differs from claim 1, in that he does not explicitly disclose pixel group which is set to have a predetermined number of multiple pixels having a two-dimensional size comprising multiple pixels arranged in primary and secondary scan directions; image output device comprising: a number data receiving module that receives the dot number data of the pixel group with respect to each type of dot; a priority order specification module that specifies a priority order of individual pixels in the pixel group for dot creation; a pixel position determination module that determines positions of dot-on pixels in the pixel group with respect to each type of dot, based on the dot number data of the pixel group with respect to each type of dot and the specified priority order; and a dot formation module that creates the multiple different types of dots at the determined positions of the dot-on pixels.

Otsuki discloses pixel group, which is set to have a predetermined number of multiple pixels having a two-dimensional size comprising multiple pixels arranged in primary and secondary scan directions (e.g., the drive signal generator is configured to generate drive signals for driving the ejection drive elements to form one of the N types of dots in each pixel area in response to print signals, column 1, lines 39-42. Note: since the drive signal generator is configured to generated drive signals to form of the N types of dots in each pixel area (pixel area = two dimensional size with primary and secondary

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direction). Thus each pixel area includes multiple pixels having a two-dimensional size comprising multiple pixels arranged in primary and secondary scan directions; e.g., the print signal PRT is converted to dot data for each 4 consecutive pixels in the main scan direction to generate combinations of mask pattern selection data MPS and dot type selection data DTS for each single pixel, Column 4, lines 45-48. Note: since the print signal PRT is converted to dot data for each 4 consecutive pixels in the main scan direction to generate combinations of mask pattern (mask pattern = having a two-dimensional size comprising multiple pixels arranged in primary and secondary scan directions)); image output device (e.g., figure 2) comprising: a number data receiving module (e.g., buffer 42A, 42B, column 3, lines 6-12) that receives the dot number data of the pixel group with respect to each type of dot (e.g., control unit 45 processes to develop dot data representing dot recording status for each pixel referencing font data and graphics functions in ROM 43, column 3, lines 9-12); a priority order specification module that specifies a priority order of individual pixels in the pixel group for dot creation (e.g., the hardware/software that perform the function disclosed in column 5, lines 50-60); a pixel position determination module (e.g., the hardware/software associated with the masking signal generation circuit 334 that perform the function disclosed in column 5, line 61 – column 6, line 21) that determines positions of dot-on pixels in the pixel group with respect to each type of dot, based on the dot number data of the pixel group with respect to each type of dot and the specified priority order (e.g., the hardware/software associated with the masking signal generation circuit 334 that perform the function disclosed in column 5, line 61 – column 6, line 21); and a dot

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formation module (e.g., the hardware/software associated with print head (module 50, figure 1) that perform the function disclosed in column 7, lines 1-7) that creates the multiple different types of dots at the determined positions of the dot-on pixels (e.g., figures 10A-10D).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu to include pixel group which is set to have a predetermined number of multiple pixels having a two-dimensional size comprising multiple pixels arranged in primary and secondary scan directions; image output device comprising: a number data receiving module that receives the dot number data of the pixel group with respect to each type of dot; a priority order specification module that specifies a priority order of individual pixels in the pixel group for dot creation; a pixel position determination module that determines positions of dot-on pixels in the pixel group with respect to each type of dot, based on the dot number data of the pixel group with respect to each type of dot and the specified priority order; and a dot formation module that creates the multiple different types of dots at the determined positions of the dot-on pixels as taught by Otsuki. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu by the teaching of Otsuki to be able to print different type of dots at different density and increase printing speed.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 16 and 17 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent<sup>1</sup> and recent Federal Circuit decisions<sup>2</sup> indicate that a statutory “process” under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. In particular, claim 16, while reciting “determining a number of dots...”, “specifying a priority order of individual pixels...”, “determining positions of dot-on pixels...” can be done either by hardware or software/program, does not define a “hardware/apparatus” and is thus non-statutory for that reasons, **recalling *In re Bilski***. A program can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program/software on “hardware/apparatus/device” in order to make the claim statutory.

Claim 17 is rejected because it depends on claim 16.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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<sup>1</sup> *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

<sup>2</sup> *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 16, 20, 23, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (Shimizu) (US 2003/0112293) in view of Otsuki (US 6,652,067).

With regard to claim 1, Shimizu discloses an image output control system (e.g., figure 2, paragraph 0045) comprising an image processing device (e.g., a control/operation portion 13, paragraph 0045) that makes image data subjected to a preset series of image processing (e.g., different preset series of image processing disclosed in paragraph 0048), and an image output device (e.g., printer 22, figure 3) that creates multiple different types of dots having different densities per unit area according to a result of the preset series of image processing (paragraph 0068), so as to output an image, image processing device comprising:

a dot number determination module (e.g., the hardware/software associated with the control/operation 13 portion that performs the function disclosed in paragraph 0071) that determines a number of dots to be created in each pixel group included in the image, with respect to each of the multiple different types of dots according to the image data (e.g., figures 9 and 10, paragraph 0068); and a number data output module that outputs (e.g., the program of the control/operation portion 13 that perform the function disclosed, paragraph 0071) the determined number of dots to be created in the pixel group with respect to each type of dot, as dot number data of the pixel group (e.g., the

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kind of dot for at least one color is different from the kinds of dot for other colors, paragraphs 0015, 0072, 0073), to image output device (e.g., a printing system, figure 2).

Shimizu differs from claim 1, in that he does not explicitly disclose pixel group which is set to have a predetermined number of multiple pixels having a two-dimensional size comprising multiple pixels arranged in primary and secondary scan directions; image output device comprising: a number data receiving module that receives the dot number data of the pixel group with respect to each type of dot; a priority order specification module that specifies a priority order of individual pixels in the pixel group for dot creation; a pixel position determination module that determines positions of dot-on pixels in the pixel group with respect to each type of dot, based on the dot number data of the pixel group with respect to each type of dot and the specified priority order; and a dot formation module that creates the multiple different types of dots at the determined positions of the dot-on pixels.

Otsuki discloses pixel group, which is set to have a predetermined number of multiple pixels having a two-dimensional size comprising multiple pixels arranged in primary and secondary scan directions (e.g., the drive signal generator is configured to generate drive signals for driving the ejection drive elements to form one of the N types of dots in each pixel area in response to print signals, column 1, lines 39-42. Note: since the drive signal generator is configured to generated drive signals to form of the N types of dots in each pixel area (pixel area = two dimensional size with primary and secondary direction). Thus each pixel area includes multiple pixels having a two-dimensional size comprising multiple pixels arranged in primary and secondary scan directions; e.g., the



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print signal PRT is converted to dot data for each 4 consecutive pixels in the main scan direction to generate combinations of mask pattern selection data MPS and dot type selection data DTS for each single pixel, Column 4, lines 45-48. Note: since the print signal PRT is converted to dot data for each 4 consecutive pixels in the main scan direction to generate combinations of mask pattern (mask pattern = having a two-dimensional size comprising multiple pixels arranged in primary and secondary scan directions)); image output device (e.g., figure 2) comprising: a number data receiving module (e.g., buffer 42A, 42B, column 3, lines 6-12) that receives the dot number data of the pixel group with respect to each type of dot (e.g., control unit 45 processes to develop dot data representing dot recording status for each pixel referencing font data and graphics functions in ROM 43, column 3, lines 9-12); a priority order specification module that specifies a priority order of individual pixels in the pixel group for dot creation (e.g., the hardware/software that perform the function disclosed in column 5, lines 50-60); a pixel position determination module (e.g., the hardware/software associated with the masking signal generation circuit 334 that perform the function disclosed in column 5, line 61 – column 6, line 21) that determines positions of dot-on pixels in the pixel group with respect to each type of dot, based on the dot number data of the pixel group with respect to each type of dot and the specified priority order (e.g., the hardware/software associated with the masking signal generation circuit 334 that perform the function disclosed in column 5, line 61 – column 6, line 21); and a dot formation module (e.g., the hardware/software associated with print head (module 50, figure 1) that perform the function disclosed in column 7, lines 1-7) that creates the

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multiple different types of dots at the determined positions of the dot-on pixels (e.g., figures 10A-10D).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu to include pixel group which is set to have a predetermined number of multiple pixels having a two-dimensional size comprising multiple pixels arranged in primary and secondary scan directions; image output device comprising: a number data receiving module that receives the dot number data of the pixel group with respect to each type of dot; a priority order specification module that specifies a priority order of individual pixels in the pixel group for dot creation; a pixel position determination module that determines positions of dot-on pixels in the pixel group with respect to each type of dot, based on the dot number data of the pixel group with respect to each type of dot and the specified priority order; and a dot formation module that creates the multiple different types of dots at the determined positions of the dot-on pixels as taught by Otsuki. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu by the teaching of Otsuki to be able to print different type of dots at different density and increase printing speed.

With regard to claim 2, Shimizu differs from claim 2 in that he does not disclose wherein priority order specification module selects one out of multiple options for the priority order, which are provided in advance, with respect to the pixel group.

Otsuki discloses wherein priority order specification module selects one out of multiple options for the priority order, which are provided in advance, with respect to the pixel group (e.g., figures 10A-F, column 7, lines 1-27).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu to include priority order specification module selects one out of multiple options for the priority order, which are provided in advance, with respect to the pixel group as taught by Otsuki. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu by the teaching of Otsuki to be able to print different type of dots at different density and increase printing speed.

With regard to claim 3, Shimizu differs from claim 3 in that he does not disclose wherein number data output module has a dot number combination mapping table that maps each combination of numbers of the multiple different types of dots to a preset code, number data output module refers to the dot number combination mapping table to convert a combination of the numbers of the respective types of dots determined with respect to the pixel group to a corresponding preset code and outputs the preset code, in place of the dot number data of the pixel group, to image output device, and number data receiving module comprises: a code mapping table that maps each preset code to a combination of the numbers of the multiple different types of dots; and a number data conversion module that receives the output preset code of the pixel group, and refers to the code mapping table to reconvert the received preset code to dot number data of the pixel group with respect to each type of dot.

Otsuki discloses wherein number data output module has a dot number combination mapping table (e.g., figure 10E) that maps each combination of numbers of the multiple different types of dots (e.g., figures 10A-10D) to a preset code (e.g., MPS

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code in figure 10E, column 7, lines 1-16), number data output module refers to the dot number combination mapping table (e.g., figure 10E) to convert a combination of the numbers of the respective types of dots (e.g., dot types selection data (A-1)-(A-4), ...(D-1)-(D-4), figure 10F, column 7, lines 17-27) determined with respect to the pixel group (e.g., dot type selection data 00, 01, 10, 11 figure 10F, column 7, lines 17-27) to a corresponding preset code (e.g., MPS code in figure 10E, column 7, lines 1-16) and outputs the preset code (e.g., MPS code, figures 7A-7B), in place of the dot number data of the pixel group (e.g., Cell (T21, T22...), figure 10F), to image output device (column 7, lines 36-38), and number data receiving module (e.g., the ejection drive elements PZT, column 5, lines 50-52) comprises: a code mapping table (e.g., figures 10E and 10F) that maps each preset code to a combination of the numbers of the multiple different types of dots; and a number data conversion module (e.g., the hardware/software that perform the function disclosed in column 7, lines 17-27) that receives the output preset code of the pixel group, and refers to the code mapping table to reconvert the received preset code to dot number data of the pixel group with respect to each type of dot (e.g., figure 10F).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu to include wherein number data output module has a dot number combination mapping table that maps each combination of numbers of the multiple different types of dots to a preset code, number data output module refers to the dot number combination mapping table to convert a combination of the numbers of the respective types of dots determined with respect to the pixel group

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to a corresponding preset code and outputs the preset code, in place of the dot number data of the pixel group, to image output device, and number data receiving module comprises: a code mapping table that maps each preset code to a combination of the numbers of the multiple different types of dots; and a number data conversion module that receives the output preset code of the pixel group, and refers to the code mapping table to reconvert the received preset code to dot number data of the pixel group with respect to each type of dot as taught by Otsuki. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu by the teaching of Otsuki to be able to print different type of dots at different density and increase printing speed.

Referring to claim 16:

Claim 16 is the method claim corresponding to operation of the device in claim 1 with method steps corresponding directly to the function of device elements in claim 1. Therefore claim 16 is rejected as set forth above for claim 1.

Referring to claim 20:

Claim 20 is the computer program product storing computer instructions claim corresponding to operation of the device in claim 1 with instruction steps corresponding directly to the function of device elements in claim 1. Therefore claim 20 is rejected as set forth above for claim 1.

With regard to claim 23, the subject matter is similar to claim 1. Therefore claim 23 is rejected as set forth above for claim 1.

Regarding claim 26, Otsuki discloses wherein the pixel group includes 4 x 2 pixels (e.g., the print signal PRT is converted to dot data for each 4 consecutive pixels in the main scan direction to generate combinations of mask pattern selection data MPS and dot type selection data DTS for each single pixel, Column 4, lines 45-48. Note: since the print signal PRT is converted to dot data for each 4 consecutive pixels in the main scan direction to generate combinations of mask pattern (mask pattern = array of halftone screen). Thus an array of halftone screen can be any size including 4x2 pixels).

Regarding claim 27, Shimizu differs from claim 27 in that he does not explicitly disclose defined for each pixel group among previously prepared multiple correspondence relations to determine the number of dots, and correspondence relation is obtained from the arrangement of multiple threshold values, which corresponds to the number of pixels included in the pixel group and is taken out from a global dither matrix.

Otsuki discloses defined for each pixel group among previously prepared multiple correspondence relations to determine the number of dots, and correspondence relation is obtained from the arrangement of multiple threshold values, which corresponds to the number of pixels included in the pixel group and is taken out from a global dither matrix (column 4, lines 44-55).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu to include defined for each pixel group among previously prepared multiple correspondence relations to determine the number of dots, and correspondence relation is obtained from the arrangement of multiple threshold

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values, which corresponds to the number of pixels included in the pixel group and is taken out from a global dither matrix as taught by Otsuki. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu by the teaching of Otsuki to be able to print different type of dots at different density and increase printing speed.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (Shimizu) (US 2003/0112293) and Otsuki (6,652,067) as applied to claim 1 above, and further in view of Shimada et al. (Shimada) (US 6,293,643).

With regard to claim 4, Shimizu and Otsuki combined, differ from claim 4 in that they do not explicitly disclose wherein pixel position determination module sequentially determines the positions of the dot-on pixels with respect to each type of dot in a descending order of the density per unit area of the multiple different types of dots.

Shimada discloses wherein pixel position determination module sequentially determines the positions of the dot-on pixels with respect to each type of dot in a descending order of the density per unit area of the multiple different types of dots (e.g., steps S350-S500, figure 12).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu and Otsuki combined, to include wherein pixel position determination module sequentially determines the positions of the dot-on pixels with respect to each type of dot in a descending order of the density per unit area of the multiple different types of dots as taught by Shimada. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu and Otsuki combined by the teaching of Shimada to have better image quality.

***Allowable Subject Matter***

Claims 5-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 5, the image output control system in according with claim 1, a first dot number determination module that compares the first dot density data with the threshold values included in the threshold value group and sets a number of threshold values that are smaller than the first dot density data to a number of the first dots to be created in the pixel group; and a second dot number determination module that compares the second dot density data with the threshold values included in the threshold value group and sets a number of the second dots to be created in the pixel group, based on the preset number of the first dots and a number of threshold values that are smaller than the second dot density data, second dot number determination



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module comparing the second dot density data with only threshold values that are greater than the first dot density data and counting the number of the threshold values that are smaller than the second dot density data, so as to set the number of the second dots to be created in the pixel group. Shimada et al. (US 6,293,643), teaches a similar method for recording image data, either singularly or in combination with cited references, fail to anticipate or render the above underline limitations obvious (to use in combination with other claimed limitations).

Claims 6-8 are object because it depends on claim 5.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang N. Vo whose telephone number is (571)270-1121. The examiner can normally be reached on 7:30AM-5:00PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on (571)272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Q. N. V./  
Examiner, Art Unit 2625

/David K Moore/  
Supervisory Patent Examiner, Art Unit 2625